



# Applying ISM to Sub-Contractors

## Lawrence Berkeley National Laboratory Lessons Learned

LL-2002-01

**Concern Statement:** A sub-contractor was hired to treat a quantity of uranium hexafluoride (UF<sub>6</sub>) for hazardous waste disposal. Because the work planning did not involve the full application of Integrated Safety Management (ISM), as would normally be done for LBNL staff performing the same work, a spill occurred. Direct and contributing causes include improper equipment and unqualified employees.

**Applicable to:** LBNL project managers who work with sub-contractors.

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### Incident

After successfully treating the UF<sub>6</sub>, a spill of approximately 5 gallons occurred within a Radioactive Material Area (RMA) while transferring the treated residuals from the reaction tank to a drum for transport and disposal. An environmental sub-contracting firm, hired because of their experience with this compound, conducted the treatment and transfer operations. As a result of the spill one of the sub-contractor's shoes became contaminated through the PPE shoe covers and was disposed of as radioactive waste. No skin or other personal contamination occurred. The highest air sample result during the clean up was approximately 0.7 DAC as read immediately with field instruments. This air sample was later analyzed at 0.06 DAC after the decay of Radon daughter products. There was no contamination outside of the RMA. The spill was cleaned up and the remainder of the reacted UF<sub>6</sub> liquid was successfully transferred into disposal drums.

### Cause

The sub-contractor's supervisor left the job site because of a family emergency. A less experienced employee was left to complete the job. Because the sub-contractor's pump that is normally used for transfer operations was broken, the sub-contractor decided that a shop vacuum could be used instead. Contrary to the requirement in the Radiological Work Permit (RWP) and job-specific training that the Radiological Control Technician (RCT) must be present during all work, the sub-contractor began the transfer operation by himself by placing the suction hose from the vacuum into the reaction tank and, with the outlet hose on the floor, briefly energized the vacuum to ensure it had power. The resultant vacuum started the residual liquid flowing. Approximately 5 gallons was siphoned out of the reaction tank and onto the floor. The direct cause of the spill was determined to be the use of inadequate equipment. Contributing cause was the use of inexperienced and unsupervised personnel to perform the job. The root cause of the incident was the failure to apply ISM after the scope of work was modified. Specifically, by not evaluating the consequences due from the changes in personnel, equipment and procedures, the core functions of ISM were not fully applied.

### Recommended Actions

In managing work with sub-contractors that may involve potential hazards and risks, LBNL managers must adhere to the principles and functions of [Integrated Safety Management \(ISM\)](#). Of special note, work planning must involve defining the scope of work, identifying the hazards, controlling the hazards, performing the work safely and proficiently, and obtaining feedback and improvements. LBNL managers must assure that there is appropriate training, proper supervision and safety standards for all work performed by sub-contract employees.

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### Further Information

Any questions regarding this incident or the lessons learned may be directed to Gary Zeman (x6626).

For other lessons learned, go to: [http://www.lbl.gov/ehs/html/lessons\\_learned.htm](http://www.lbl.gov/ehs/html/lessons_learned.htm)

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